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INDIA.

Reports from Bombay—Cholera, plague, and smallpox.

Acting Asst. Surg. Edward H. Hume reports, July 16 and 22, as follows:

Mortality of Bombay City, week ended July 12, 1904.

	Week ended July 12, 1904.	Week ended July 14, 1903.	Average of same week, 5 years, 1899-1903.	Average of same week, 5 years, 1891-1895.
Plague attacks.....	35			
Plague deaths.....	33	68	56	0
Plague mortality per 1,000.....	2.21	4.55	3.75	0
Smallpox deaths.....	10	14	7	3
Cholera deaths.....	0	1	36	5
Total deaths.....	543	499	655	448
Total mortality per 1,000.....	36.38	33.43	42.88	28.34

Deaths from bowel complaints numbered 49, the rainy season always causing an increase in this trouble.

Work of the plague research laboratory, Bombay.

The fundamental object of the laboratory is to provide the means for eliminating plague, and as no other means have been found as successful as the use of Haffkine's prophylactic fluid, most of the energy of the laboratory has been directed to the production of a fluid that shall protect for as long a period as possible and with as small a dose as possible. Improvements in the fluid have been repeatedly introduced, and the following facts will show the extent of production in the laboratory:

The plague prophylactic.

During the 22 months between June 1, 1902, and March 31, 1904, there were manufactured 2,890,184 adult doses of prophylactic, and issued on indents from India and abroad. Of this amount, 2,869,097 doses went to places in India and 21,087 doses to other countries. Previous to June 1, 1902, from January 10, 1897, when the prophylactic was discovered, there were issued from the laboratory 2,867,041 adult doses, of which quantity 2,383,162 went to India, and 483,879 abroad. The activity of the last 22 months was therefore greater by 23,000 doses than that of the 52½ months preceding. The total amount of prophylactic issued from the laboratory since the commencement of plague inoculation is 5,757,225 doses, of which 5,252,259 went to India and 504,966 abroad.

The consumption in India has been as follows:

	Doses.
Punjab (twice as many as in any other district).....	3,332,667
Bombay Presidency and Sind.....	1,056,938
The native States.....	488,074
Bengal and Behar.....	102,588
Madras Presidency.....	99,011
The united provinces (Agra and Oudh).....	70,842
The central provinces.....	40,150
Other provinces.....	61,989

These figures indicate roughly, also, the relative extent to which plague has attacked the various provinces.

Outside of India, 219,776 doses have gone to Africa, 162,147 to Australia, 60,745 to Asia, 55,315 to Europe, 5,720 to Australasia, and 1,263 to America.

The doses sent to America have all gone to British possessions, as follows:

	Doses.
Barbados, January 3, 1900.....	51
Grenada, September 12, 1900.....	1,008
Trinidad, June 3, 1901.....	204
Total to America.....	1,263

Examination of plague-suspected animals.

In April and May, 1903, a severe epidemic occurred among the animals of the Victoria Zoological Gardens in Bombay. A number of the dead animals—deer, kangaroos, rabbits, guinea pigs, monkeys, and various species of birds—were sent to the laboratory for examination. In none but guinea pigs were plague bacilli found. There was a general epidemic among the guinea pigs. In one goat, plague-like bacilli were found, but their authentic nature was not confirmed.

In 198 examinations of rats (106 alive, 92 dead) plague infection was detected thirty-three times.

Plague bacilli in the blood.

The blood of a large number (how many is not stated) of plague patients was examined and injected into rats. It was found that in 60 per cent of the so-called bubonic cases (in contradistinction to the septicæmic, nonbubonic ones) plague bacilli were in the peripheral blood on first admission to hospital. Such cases were nearly all fatal. The cases in which bacilli were not found in the peripheral blood on admission to hospital, gave a mortality half as great as that of the others.

Researches on the plague bacillus in nature.

These were undertaken in view of the fact that when plague broke out in 1896, it remained for a considerable time in a district of Bombay known as Mandvi, whose inhabitants were workers in other parts of the city, viz, in the docks and elsewhere, and that of the various races and castes the Jains at that time were mostly affected.

Evidence seemed to show that people were not favorable carriers and disseminators of infection; that plague was not carried by water like cholera, for the affected houses had the same supply as many others; that it was not carried by the atmospheric air, which would have rapidly scattered it over large areas; that it was not spread by winged or other insects migrating readily from house to house; but that, of parasitic vermin, it might be carried by bugs, which stick not only to houses, but even to the same pieces of furniture, or by fleas, which remain in the earth, and in the sweepings of floors of houses. The Jains, being worshipers of life in every form, will never kill bugs or insects, and even feed them artificially, and this consideration shown by them to vermin seemed to conform to the hypothesis. Ac-

cordingly, in response to a suggestion made by Professor Haffkine, Mr. E. H. Hankin undertook a series of experiments on ants, for which the Jains arrange regular feasts in their houses.

He found that corpses of plague-stricken rats were attacked by large numbers of these insects; that when they leave such a corpse, plague bacilli are discoverable on their feet and antennæ; that the same species of ants feed on men's food preserved in houses, which they may contaminate, and that they sometimes bite human beings. Mr. Hankin, being unable to extend his investigations to other insects, Doctor Simond continued the research with reference to fleas. His experiments were attended with negative results in a large number of cases, as have been those of other bacteriologists. It is known, however, that in New South Wales the investigations of Dr. J. Ashburton Thompson and of Dr. Frank Tidswell seem to support the idea that fleas and bugs are concerned in transmitting plague.

Experiments with a curative serum for plague.

(a) One hundred and eleven patients were treated in the Modikhana Municipal Plague Hospital, Bombay, with serum prepared by Professor Terni, of Messina; 90 of them died. Of 112 not so treated, and observed for comparison, 91 died. In the Maratha Municipal Plague Hospital, 16 were treated with this serum, of whom 12 died, while of 16 others observed for comparison, 11 died.

(b) Of 50 patients treated in the Maratha hospital, with serum prepared by Doctor Brazil, of San Paulo, 41 died, while of 50 control cases, 45 died. In the Modikhana hospital, of 20 so treated, 17 died, while of 20 non treated, 15 died. All the above patients were treated by hypodermic injections, the doses in some cases running into hundreds of cubic centimeters.

(c) At present a trial is being made of a serum prepared at the Pasteur Institute in Paris, by Roux, Yersin and Borell.

Studies on diseases other than plague.

1. *Antityphoid vaccine*.—Twenty-eight doses of this vaccine were prepared in the laboratory and supplied to medical officers in several parts of India.

2. *Snake venom and antivenene*.—In April, 1903, the animals which were being immunized with snake venom for the preparation of antivenene were transferred to Kasauli in the Punjab. There were sent at the same time such supplies of snake venom as had been collected, the amount being sufficient for many years of work. Venom is still being collected at the laboratory, and after being dried is sent to Kasauli for purposes of immunization. Between June 1, 1902, and March 31, 1904, there were received at the laboratory 676 live snakes, sent from various parts of India, chiefly from the central provinces. Of this number 194 were cobras (*Naja tripudians*) and 158 were Russell's vipers (*Daboia russellii*).

Between June 1 and September 30, 1902, 481 bottles of antivenene were supplied to medical officers in India. After that date the supplies were sent out from Kasauli.

3. *Scorpion venom*.—Captain Greig, of the Indian medical service, undertook a series of experiments with a view to ascertaining the minimum lethal dose of this venom for animals and its effect upon the